

Original Investigation

A cross-national comparative study of smoking prevalence and cessation between English and Dutch South Asian and African origin populations: the role of national context

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Abstract

Background: Evidence suggests that Dutch people smoke substantially more than their British counterparts. These differences have been suggested to relate, in part, to the health-related policy differences between the two countries. It is unclear whether these differences affect smoking among ethnic minority groups in similar ways. We assessed whether the lower smoking prevalence in the U.K. general population compared with the Netherlands is also observed in ethnic minority groups (i.e., Dutch vs. English South Asians and Dutch- vs. English-Africans).

Methods: We used similar surveys from the United Kingdom and the Netherlands to explore these questions. The response rate ranges from 60% in the Health Survey for England and the SUNSET study to 67.5% in Newcastle Heart Project ($n = 21,429$).

Results: After adjustment for other factors, compared with White-Dutch, the prevalence ratio (PR) of current smoking was lower in White-English men (PR = 0.58, 95% CI: 0.49–0.67) and women (PR = 0.56, 0.49–0.65). Among African groups, compared with Dutch-African, the prevalence of current smoking was lower in English- African Caribbean men (PR = 0.48, 0.31–0.75) and women (PR = 0.47, 0.39–0.69) and Sub-Saharan African men (PR = 0.53, 0.29–0.99) and women (PR = 0.37, 0.14–0.99). Among South Asian groups, compared with Dutch South Asian, the prevalence of smoking was lower in English-Indian men (PR = 0.67, 0.51–0.89) and women (PR = 0.16, 0.07–0.37), Pakistani men (PR = 0.62, 0.46–0.82) and women (PR = 0.13, 0.05–0.33), and Bangladeshi men (PR = 0.77, 0.59–0.99) and women (PR = 0.11, 0.03–0.45). Ever-smoking rates

were lower and smoking cessation rates were higher in the English ethnic groups than in the Dutch ethnic groups except for smoking cessation among the South Asian women.

Conclusion: Similar to the White group, the prevalence of smoking was lower in South Asian and African men and women in England than their corresponding Dutch counterparts. These differences suggest that, among other factors, antismoking policies might have a similar influence on both ethnic majority and minority groups and illustrate the potential importance of national context on public health policy on ethnic minority groups' smoking behavior.

Introduction

Cigarette smoking is one of the leading preventable causes of death. Smokers who quit smoking reduce their risk of developing and dying of tobacco-related diseases, even if they stop after they develop cardiovascular or chronic pulmonary disease (Anthonisen et al., 2005; Critchley & Capewell, 2004; Department of Health and Human Services, 1990; Doll, Peto, Boreham, & Sutherland, 2004). Consequently, smoking prevention and cessation are a priority for health policy in many countries (Joossens & Raw, 2006; Levy, Nikolayev, & Mumford, 2005; Schaap et al., 2008). Several smoking cessation interventions (such as increases in tobacco tax, bans on advertisement, ban on smoking in workplaces, provision of nicotine-replacement therapy, and intensive counseling for smoking cessation) have been shown to be effective in reducing smoking rates (Anthonisen et al.; Centers for Disease Control and Prevention, 2008; Critchley &

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Capewell; Department of Health and Human Services). In the past few decades, many countries have implemented more or less comprehensive tobacco control policies. The implementation of these policies may have had a major impact on reducing smoking rates (Joossens & Raw; Levy et al.; Schaap et al.). In most Organisation for Economic Co-operation and Development (OECD) countries, the proportion of current smokers has shown a decline over the past few decades. Despite the decline, there are still important differences in smoking prevalence between countries. For example, compared with the other OECD countries, such as the United Kingdom and Sweden, the prevalence of smoking in the Netherlands is still relatively high (OECD, 2008). These differences may be related to the smoking policies between these countries (Joossens & Raw). Countries with more developed tobacco control policies have higher quit rates than countries with less developed tobacco control policies (Giskes et al., 2007; Joossens & Raw; Schaap et al.). Recent work by Joossens and Raw shows that the Netherlands scored lower on the Tobacco Control Scale than the United Kingdom.

Evidence suggests that both high- and low-educated smokers have benefited from the nationwide tobacco control policies (Schaap et al., 2008). It is unclear, however, whether ethnic minority groups have also benefited from the robust tobacco control policies. Many of the smoking-related conditions such as heart disease, stroke, and respiratory disease are dominant causes of death in ethnic minority groups (Gill, Kai, Bhopal, & Wild, 2007). Despite this, the prevalence of smoking varies between ethnic groups (Bhopal et al., 1999; Chae, Gavin, & Takeuchi, 2006; Erens, Primatesta, & Prior, 2001; Lindstrom & Sundquist, 2002; Nierkens, de Vries, & Stronks, 2006). In the Netherlands, the prevalence of smoking has been shown to be higher among the Turkish and Surinamese men than among White-Dutch people (Nierkens, de Vries, & Stronks). The U.K. studies also show substantial differences in the prevalence of smoking between ethnic groups (Bhopal et al.; Erens et al.).

Several factors may contribute to the observed ethnic groups' differences in smoking, including socioeconomic status, culture, smoking behavior in the country of origin prior to migration, level of acculturation, and psychosocial stress (Acevedo-Garcia, Pan, Jun, Osypuk, & Emmons, 2005; Bush, White, Kai, Rankin, & Bhopal, 2003; Hanna, Hunt, & Bhopal, 2006; Mermelstein, 1999; Nierkens, Stronks, van Oel, & de Vries, 2005; White, Bush, Kai, Bhopal, & Rankin, 2006). The antismoking policy differentials between the United Kingdom and the Netherlands could have a major impact on smoking behavior among ethnic minority groups and consequently differences in prevalence of smoking between ethnic groups living in the United Kingdom and the Netherlands.

In this study, we aim to assess whether the lower prevalence of smoking in the United Kingdom compared with the Netherlands is also observed in ethnic minority groups with common geographic origin (i.e., South Asian and African men and women) living in these two countries and whether the observed differences reflected on smoking initiation and cessation (Joossens & Raw, 2006). Our primary hypothesis was that after adjusting for individual sociodemographic and cultural factors, the prevalence of smoking would be lower in both English-White people and their ethnic minority groups than their corresponding Dutch-White people and their ethnic minority groups due to more comprehensive antismoking policies in the United Kingdom. Smoking

cessation rate is an important indicator of the effectiveness of tobacco control policies (Schaap et al., 2008). We therefore hypothesized that the relatively high scores on antismoking policies in the United Kingdom would reflect on higher smoking cessation rates among the U.K. ethnic groups than their Dutch counterparts.

Analysis of international datasets on cardiovascular disease (CVD) and risk factors in multiethnic populations constitutes a potentially important approach, but so far very little attention has been paid to this. Data on similar ethnic minority groups, such as South Asian descent populations, who have migrated in very different circumstances to different countries, provide the opportunity to carry out comparative analyses that will facilitate greater understanding of ethnic inequalities in smoking. First, we define the ethnic groups and give brief histories of migration.

Note on ethnicity

Appropriate terms for the scientific study of health by ethnicity are under discussion (Bhopal, 2004). Different terms are used to refer to populations of South Asian origin and African origin living in different European countries (Agyemang, Bhopal, & Bruijnzeels, 2005; Bhopal, 2004; Stronks, Kulu-Glasgow, & Agyemang, 2009). In the United Kingdom, the term *South Asian* refers to populations originating from the Indian Subcontinent, effectively, India, Pakistan, and Bangladesh. African Caribbean refers to people, and their offspring, with African ancestral origin but who migrated to the United Kingdom via the Caribbean islands. Sub-Saharan African refers to people, and their offspring, with African ancestral origin who migrated via Sub-Saharan Africa. The migration of the populations of African descent from the Caribbean and Africa and South Asian from subcontinent to the United Kingdom in the mid-20th century was mainly due to the need to rebuild United Kingdom following World War II. The demands of an expanding economy and the development of the welfare state required labor on a scale that could not be provided locally. Consequently, British Commonwealth citizens were encouraged to come to Great Britain. In the Netherlands, the term *African Surinamese* is used to refer to people with African ancestral origins and their offspring who migrated to the Netherlands via Suriname (Agyemang Bhopal, et al.). African Surinamese are mainly the descendants of West Africans who were taken to the Suriname during the slave trade era. The term *Hindustani Surinamese* is used to refer to people with South Asian ancestral origin, and their offspring who migrated to the Netherlands via Suriname. The Hindustani Surinamese are the descent of the indentured laborers from North India—Uttar Pradesh, Uttaranchal, and West Bihar. After the abolition of slavery in 1863, the emancipated Africans were unwilling to continue working on the plantations because of poor labor conditions. To guarantee a constant supply of labor, the planters imported indentured laborers from North India between 1873 and 1917. The migration of the African Surinamese and Hindustani Surinamese to the Netherlands was mainly due to the political situation in Suriname. There were two large migration waves. The first was around independence of Suriname in 1975 and the second wave was around the revolution coup of the Desi Bouterse in February 1980 (Stronks et al.). *White* is the term most commonly accepted and used to describe people with European ancestral origins. For the purposes of this paper, based on populations in the Netherlands (Amsterdam) and England

(National and Newcastle upon Tyne), we use the following terminology:

- for England-based South Asians → English South Asians (further qualified as appropriate as English-Indian, English-Pakistani, and English-Bangladeshi)
- Dutch-based Hindustani Surinamese → Dutch South Asian
- England-based African Caribbean → English-Caribbean
- England-based Sub-Saharan Africans → English-African
- Dutch-based African Surinamese → Dutch-African
- England-based people of English European origin → White-English
- Dutch-based people of European origins → White-Dutch.

Methods

This study is as part of a developmental project to work out approaches to cross-national comparisons as a grounding for future multinational comparisons.

Study population

Data came from population-based studies, which collected data on CVD and risk factors in South Asian origin and African origin as well as European origin populations in England and the Netherlands. The data on the English ethnic groups came from the Health Survey for England (HSE) and the Newcastle Heart Project (NHP). The data on the Dutch ethnic groups came from the SUNSET study. Full details of the studies have been published elsewhere (Agyemang, Bindraban, et al., 2005; Bhopal et al., 1999; Erens et al., 2001). Short descriptions of the studies are given below.

The HSE comprises a series of annual surveys commissioned, until recently, by the Department of Health and was designed to provide regular information on a range of aspects concerning the nation's health that cannot be obtained from other sources. The HSE 1999 and 2004 focused on the health of ethnic minority groups. In these years, the general population had no nurse visit, so data from HSE 1998 and 2003 have been used to allow comparisons with the general population. The individual response rate for the ethnic minority sample was 60% for surveys in 1999 and 63% for 2004; the equivalent figures for the individual response rate in the general population were 69% in 1998 and 66% in 2003. Ethnic groups were classified according to the self-reported ethnic origin of the respondent.

The NHP was carried out between 1994 and 1997 to compare coronary heart disease risk factors in English-Indian, English-Pakistani, and English-Bangladeshi with White-English. The White-English sample was drawn from the family health services authority register for the Newcastle health and lifestyle survey. The South Asian samples were drawn from the full register. The sampling frames were each divided into 10-year age and sex strata and equal numbers from each stratum were randomly selected. The response rate was 67.5% for South Asian and 64.2% for White-English people. Ethnic groups were classified by name analysis confirmed by self-report and grandparents' place of birth.

The SUNSET study was carried out to assess the cardiovascular risk profile of Dutch-African, Dutch South Asian, and

White-Dutch people. A study sample of 35- to 60-year-old people was drawn from the Amsterdam population register. People were approached for an oral interview between 2001 and 2003. The overall response rate was 60% among the ethnic minority groups and 61% among White-Dutch. Ethnic groups were classified according to the self-reported ethnic origin of the respondent and/or the ethnic origin of the mother and father

Measurements

Although data collections in the different studies were designed independently, similar themes were covered in their questionnaires, giving the possibility for the combined analysis of their data. In addition, a cross-standardization of data was undertaken to ensure that questionnaires were as comparable as possible between studies. To achieve this, two workshops composed of all the collaborators and a methodologist were held in Academic Medical Centre, Amsterdam, to discuss methodological issues including standardization of content, formatting, and analytic programs. A standardization protocol was then developed and all the individual datasets were combined into one database.

In all studies, participants completed a similar questionnaire that included questions on smoking, educational level and employment status, duration of residence, and religious affiliation. Cigarette smoking status was self-reported and respondents were classified as "never-smoker," "ex-smoker," and "current smoker." Smoking prevalence rates were calculated as the ratio of the number of current smokers divided by the total number of respondents. Ever-smokers rates were calculated as the ratio of the number of former smokers and current smokers divided by the total number of ever- and never-smokers. Smoking cessation rates were calculated as the ratio of the number of ex-smokers divided by the number of ever-smokers.

In all studies, educational level was based on the highest qualification gained and was classified as "those with less than secondary school or an A-level certificate," "those with A-levels or Dutch A-level equivalent (VWO) graduation certificate," and "those with polytechnic or university degrees." Employment status was classified as "employed or in fulltime education," "unemployed," and "other economic inactive or retired." Length of residence was based on the number of years lived in the residing country. Religion was based on self-reported religious affiliation and was classified as "Christian," "Hindu," "Muslim," and other.

Data analysis

The age delimitation of participants in HSE was ≥ 16 years, in the NHP was 25 to 74 years, and in the SUNSET study was 35 to 60 years. Because of differences in the ages covered in the different studies, only those aged 35–60 years were included in the analyses ($n = 21,429$). The HSE 2003 and 2004 used a complex survey design, and consequently, the samples were weighted to correct for the unequal probabilities of selection for different classes of respondents and for nonresponse. The prevalence rates were age-standardized in order to remove the effect of age from comparisons between groups. Direct standardization was applied for both sexes, expressing male and female data to the overall population, with the standards being the age distribution of the total population. Chi-square tests were used to assess differences in categorical variables. Differences in continuous

variables were assessed by means of analyses of variance. Prevalence ratios and their 95% CIs were estimated by means of binomial regression with robust variance (Barros & Hirakata, 2003; Skov, Deddens, Petersen, & Endahl, 1998) and adjusted for individual factors that are known to be associated with smoking: age, education level and employment status, religion, and duration of residence (Acevedo-Garcia et al., 2005; Bush et al., 2003; Hanna et al., 2006; Mermelstein, 1999; Nierkens et al., 2005). Religion was adjusted for only in the South Asian and African groups because large proportion of White-English had no information on religion. In addition, we adjusted for year of survey because evidence suggests a slight decline in the prevalence of smoking in the last few years in both the United Kingdom and the Netherlands (OECD, 2008). For these analyses, the Dutch groups are used as the reference categories. Data were analyzed separately for men and women. All analyses were performed using STATA 9.2 (Stata Corp., College Station, TX).

Results

Sample characteristics

The characteristics of the study are presented in Table 1. Among the White groups, the White-Dutch men and women were older and were more likely than their White-English counterparts to be highly educated. Among African groups, African Dutch men and women were less educated and were more likely to be Christians than their English-Caribbean and English-African counterparts. Dutch-Africans had a shorter length of stay than English-Caribbean. Among South Asian groups, the Dutch South Asian men had the lowest rate of high education. The Dutch South Asian men were also less likely than the English-Indian men to be employed. About three quarters of Dutch South Asian men and nearly half of English-Indian men described their religion as Hindu, while nearly all English-Pakistani and English-Bangladeshi men described their religion as Muslim. Among women, the Dutch South Asians were less educated than the English-Indians but were more educated than the English-Bangladeshi. The Dutch South Asian women were more likely than the English-Pakistani and the English-Bangladeshi women to be employed. The Dutch South Asian women had a shorter length of stay than the English-Indian and the English-Pakistani women but a longer length of stay than the English-Bangladeshi women.

Prevalence of current smoking, ever smoking, and smoking cessation

White-Dutch versus White-English

Among Whites, the age-standardized prevalence rates of current smoking and ever smoking were significantly lower and smoking cessation rate was significantly higher in White-English than their White-Dutch counterparts in both men and women (Figures 1a–3b); the differences persisted after further adjustment for educational level and employment status (Tables 2 and 3).

Dutch-African versus English-Caribbean and English-African

Among men, the age-standardized prevalence rates of current smoking and ever smoking were significantly lower in English-African groups than their Dutch equivalent (Figures 1a and 2a). The differences persisted after further adjustment for educa-

tional level, employment status, length of stay, and religion (henceforth, other factors), except for ever smoking in English-Africans (Tables 2 and 3). English-African groups were also significantly more likely than their Dutch-Africans to quit smoking after other factors had been adjusted for (Table 3). Among women, the age-standardized prevalence of current smoking was significantly lower in English-African groups than in Dutch-African women (Figure 1b); the differences persisted after further adjustments for other factors (Table 2). Age-standardized prevalence of ever smoking was only significantly lower in English-Africans than in Dutch-Africans. However, after further adjustments for other factors, both English-African groups were significantly less likely than their Dutch counterparts to ever-smoke. English-Caribbean women were significantly more likely than Dutch-African women to give up smoking (Figure 3b) even after other factors had been adjusted for (Table 3). There were no significant differences in smoking cessation between English-African and Dutch-African women. The differences in the prevalence of smoking and ever smoking between the Dutch-African and the English-African groups were larger in women than in men.

Dutch South Asians versus English South Asian groups

Among men, the age-standardized prevalence rates of current smoking and ever smoking were significantly lower in the English-Indian and English-Pakistani men than in the Dutch South Asian men (Figures 1a and 2a) even after further adjustments for other factors (Tables 2 and 3). The age-standardized prevalence rates of current smoking and ever smoking did not differ between English-Bangladeshi and Dutch South Asian. However, after further adjustment for other factors, English-Bangladeshi men were significantly less likely than Dutch South Asians to be current smokers (Table 3). The age-standardized prevalence of smoking cessation was significantly higher in English-Indian and English-Bangladeshi men than in Dutch South Asian men. The difference between English-Bangladeshi and Dutch South Asian men persisted after further adjustment for other factors. Among women, the age-standardized prevalence rates of current smoking and ever smoking were significantly lower in all the English South Asian groups than their Dutch South Asian counterparts (Figures 1b and 2b); the differences persisted after further adjustment for other factors (Tables 2 and 3). Smoking cessation rates did not differ between the English South Asian groups and their Dutch counterparts. The differences in the prevalence of smoking and ever smoking between the Dutch South Asian and their English South Asian counterparts were substantially larger in women than in men.

Discussions

Key findings

Tobacco smoking is more prevalent in the Netherlands than in the United Kingdom. We assessed whether the lower prevalence of smoking in England compared with the Netherlands is also observed in ethnic minority men and women living in these two countries. Our findings indicate that, similar to the majority group, the prevalence of smoking was lower in English South Asian and African ethnic groups than in their corresponding Dutch counterparts in the Netherlands. The differences in smoking rates were much more striking between the English and the Dutch ethnic minority women than between the

Table 1. Characteristics of the study population (age, education level, employment status, religion, and length of stay) by sex

English- and Dutch-White groups				English- and Dutch-African groups				English and Dutch South Asian groups				
	White-Dutch	White-English	p Value	Dutch-African	English-African	English-Caribbean	p Value	Dutch South Asian	English-Indian	English-Pakistani	English-Bangladeshi	p Value
Men	n = 259	n = 6,355		n = 210	n = 201	n = 396		n = 160	n = 647	n = 511	n = 382	
Age (SD)	47.7 (6.7)	46.7 (7.8)	<.05	43.7 (6.3)	42.8 (7.0)	44.1 (8.0)	.1337	44.3 (6.6)	45.4 (7.2)	44.5 (7.4)	43.1 (7.3)	<.001
Length of stay (SD)	—	—		22.9 (8.8)	13.9 (9.9)	33.0 (10.5)	<.001	23.9 (7.9)	26.0 (10.2)	25.7 (10.3)	22.3 (10.3)	<.001
Educational qualification gained												
Poly/university degree	41.4	35.2	<.001	16.3	52.5	31.1	.0000	8.2	41.5	23.9	13.7	<.001
“A” level	27.9	11.1		22.9	9.3	11.4		18.1	10.5	11.8	5.8	
≤ Secondary or “A” level	28.2	51.7		58.6	38.2	55.8		69.0	46.0	61.8	79.6	
Other	2.5	2.0		2.2	0.0	1.7		4.7	2.0	2.5	0.9	
Employment status												
Employed	86.5	83.2	.1467	78.4	75.6	71.1		67.3	81.2	63.7	50.3	<.001
Unemployed	3.8	4.2		7.7	10.4	12.8		7.9	5.0	10.8	16.7	
Other inactive	9.7	12.7		13.9	14.0	16.1		24.9	13.8	25.5	33.0	
Religion												
Christian	—	—	—	97.1	69.9	76.4	<.001	8.0	6.0	1.0	0.2	<.001
Hindu	—	—		0.4	2.3	0		61.2	47.6	0	0.5	
Muslim	—	—		0	17.7	0.8		30.8	13.5	98.6	98.6	
Other	—	—		2.5	10.0	22.9		0	32.9	0.4	0.7	
Women	n = 286	n = 7,552		n = 420	n = 229	n = 710		n = 199	n = 761	n = 538	n = 360	
Age (SD)	47.4 (6.8)	46.5 (7.8)	<.001	43.4 (5.8)	42.2 (6.9)	43.8 (7.7)	<.010	44.7 (6.5)	45.3 (7.4)	44.6 (7.3)	45.4 (7.7)	.182
Length of stay (SD)	—	—		21.6 (9.4)	14.9 (10.1)	31.6 (10.9)		21.4 (8.5)	25.7 (9.4)	23.4 (9.1)	18.1 (7.1)	<.001
Educational qualification gained												
Poly/university degree	34.1	24.6	<.001	21.5	47.2	35.5	<.001	10.3	26.5	13.9	3.0	<.001
“A” level	27.1	9.6		28.6	13.1	11.1		17.7	9.7	7.3	2.7	
≤ Secondary or “A” level	36.4	60.3		45.7	39.1	50.5		67.5	60.2	76.9	94.3	
Other	2.4	5.5		4.2	0.6	2.9		4.5	3.6	1.6	0.0	
Employment status												
Employed	73.3	70.6	.1240	73.3	62.9	64.6	<.010	52.9	58.5	18.0	9.0	<.001
Unemployed	2.4	2.2		8.4	4.8	5.1		15.9	2.9	0.5	0.5	
Other inactive	24.2	27.3		18.3	32.3	30.3		31.2	38.6	81.5	90.5	
Religion												
Christian	—	—	—	95.1	82.0	87.5	<.001	21.9	7.7	1.1	1.1	<.001
Hindu	—	—		0.2	0.0	0.1		46.9	46.7	0.0	0.6	
Muslim	—	—		0.0	11.4	0.7		29.6	11.7	98.4	97.3	
Other	—	—		4.7	6.4	11.7		1.6	33.9	0.5	1.0	

Note. U.K. data are based on Health Survey for England and Newcastle Heart Project and the Dutch data are based on the SUNSET study; poly = polytechnic.

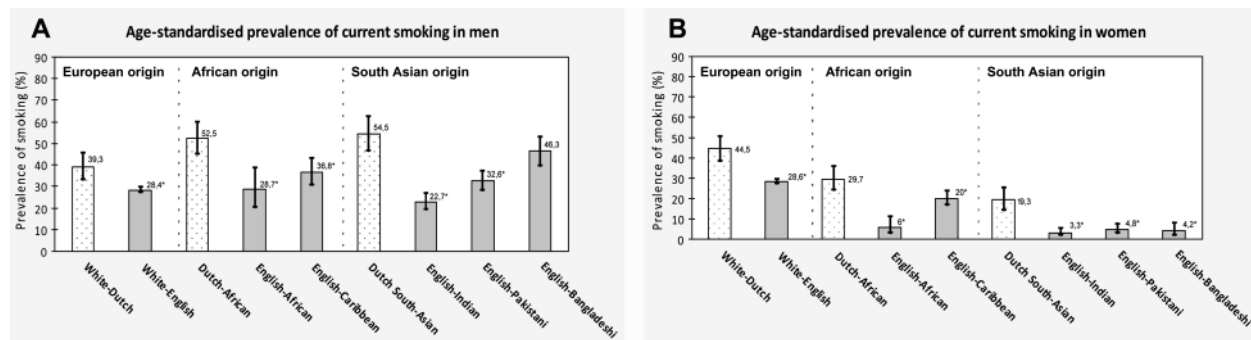


Figure 1. (A and B) Age-standardized prevalence of current smoking by ethnic groups and sex. Figures are age-standardized prevalence with corresponding 95% CIs; * $p < .05$.

English and Dutch ethnic minority men. Ever-smoking rates were lower and smoking cessation rates were higher in English-African groups and South Asian men than in their Dutch counterparts.

Strengths and limitations

A multicentre approach of using the existing databases provides new opportunities for advancing our knowledge on ethnic inequalities in health (Bhopal, 2009). The success of this approach required collecting the original data from each geographic setting. This facilitated cross-standardization of studies between countries, generated larger numbers for within- and between-group comparisons, and provided an important opportunity to examine more closely ethnic differences in smoking and the contribution of other pertinent factors. In addition, there is limited literature in this area of research. The data also have some limitations. First, the cross-sectional design nature of the included studies makes it impossible to follow the smoking history of the individuals. However, all the studies included retrospective questions on smoking behavior, which allowed for descriptive analyses of inequalities in ever smoking and smoking cessation between the ethnic groups living in the Netherlands and England (Power et al., 2005; Schaap et al., 2008). Second, data collections in the different studies were designed independently. The differences in the studies' methods may have introduced bias in the prevalence estimates. Nevertheless, this potential bias is likely to be small, because all the studies covered similar themes in their questionnaires, giving the possibility for the combined analysis of their data. Third, as in many studies, our analyses were based on self-reported data. Underreporting of smoking can therefore not be ruled out, especially among the

ethnic minority communities where smoking has strong negative connotations (Bush et al., 2003; White et al., 2006). Fourth, due to lack of data, we were unable to assess the smoking behavior of the younger age group (i.e., <35 years), which may differ from the older age group we studied. Fifth, the Dutch data were based on one major city in the Netherlands, while English data were based on one medium-size city in England, and a sample of the population of England, which may limit comparability of the study results. Nonetheless, our findings are consistent with the national data of both countries (OECD, 2008). In addition, majority of ethnic minority groups in both countries reside in cities (Gill et al., 2007; Stronks et al., 2009). Lastly, we did not have data on all the pertinent factors such as experience of discrimination and other cultural factors such as gender stigmatization of smoking, which may relate to smoking behavior. In the analyses, we adjusted for religion and duration of residence in the residing countries in the ethnic minority groups. However, these factors may not capture all the relevant cultural factors that may influence smoking behavior. Future studies should explore this issue further.

Discussion of key findings

The prevalence of smoking was higher in the Dutch-South Asian and Africans than their English South Asian and African counterparts with the differences being more marked in women than in men. The differences persisted after further adjustment for other factors. These findings may suggest that, among other factors, antismoking policies have a similar influence on both ethnic majority and minority groups and illustrate the importance of the national antismoking policies on ethnic minority groups' smoking behavior. Countries with more robust tobacco

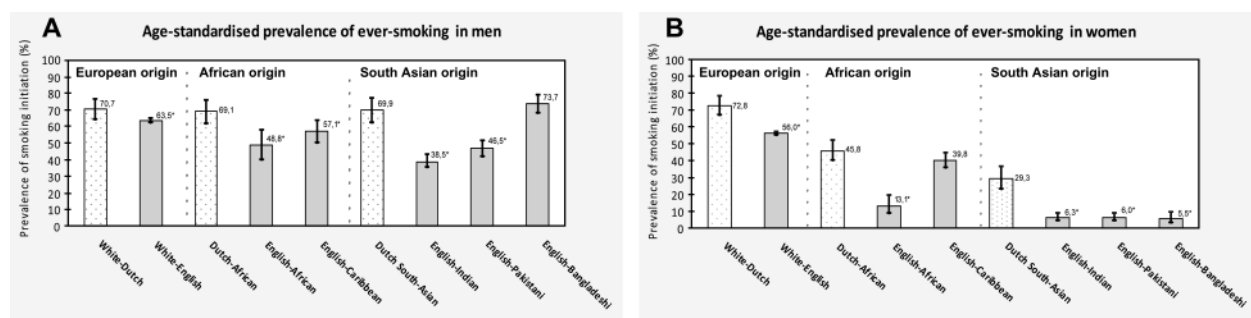


Figure 2. (A and B) Age-standardized prevalence of ever smoking by ethnic groups and sex. Figures are age-standardized prevalence with corresponding 95% CIs; * $p < .05$.

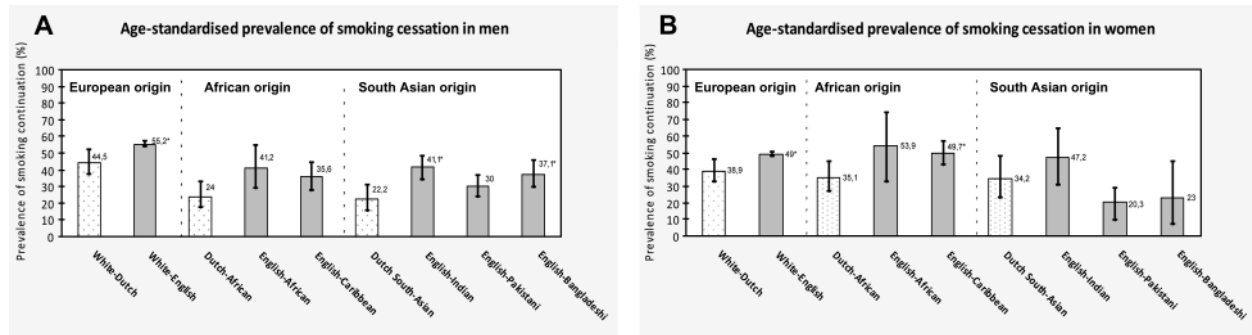


Figure 3. (A and B) Age-standardized prevalence of smoking cessation by ethnic groups and sex. Figures are age-standardized prevalence with corresponding 95% CIs; * $p < .05$.

control policies have higher quit rates than those with less robust tobacco control policies (Giskes et al., 2007; Joossens & Raw, 2006; Schaap et al., 2008). Compared with the United Kingdom, the Netherlands spends less money on public anti-smoking campaigns (Joossens & Raw). In addition, the price of cigarettes in the Netherlands is lower and the opportunities to have professional support for quitting smoking are less available than in the United Kingdom (Joossens & Raw).

The reasons for the marked differences in the prevalence of smoking in women compared with men between the two countries, especially between the Dutch South Asian and their English South Asian counterparts, are unclear. These different patterns of smoking behavior between men and women in these two countries suggest that others factors may also play a role. The study by Bush et al. (2003) found that smoking was a widely accepted practice in Pakistani and Bangladeshi men. Among women, however, smoking was associated with shame and stigma. Although there are no comparable data among the Dutch South Asian population, it is plausible that these cultural norms may be less strict for Dutch South Asians than for English South Asians because of their prior exposure to the Caribbean culture.

The smoking behavior among the Dutch South Asian women mimics the Caribbean groups more than the South Asian groups. This may relate to smoking behavior in their country of origin. For example, in 2007, the prevalence of current cigarette smoking was 9.9% in women compared with 38.4% in men in Suriname. In India, the prevalence of current smoking was 1.4% in women compared with 33.4% in men (<https://apps.who.int/infobase/report.aspx>).

Smoking cessation rates in the Dutch ethnic minority groups were particularly low compared with their English counterparts, especially in men. Smoking cessation rate is a key indicator of the effectiveness of antismoking policies (Schaap et al., 2008). Our finding may therefore reflect differential anti-tobacco policies between the two countries. Evidence from the United Kingdom and the United States suggests that ethnic minority smokers attempt to quit as often as nonminority smokers but use effective treatments less often and have lower success rates (Flore et al., 2008; Bush et al., 2003; Chae et al., 2006; Hanna et al., 2006; White et al., 2006). The Dutch data (Nierkens, Stronks, & de Vries, 2006), by contrast, suggest that the majority of the Surinamese smokers were not motivated to

Table 2. Adjusted PRs (95% CI) of current smoking within European, South Asian, and African origin populations by sex

	Men			Women		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
	PR (95% CI)	PR (95% CI)	PR (95% CI)	PR (95% CI)	PR (95% CI)	PR (95% CI)
Dutch- vs. English-Whites						
White-Dutch	1.00	1.00	—	1.00	1.00	—
White-English	0.63 (0.54–0.74)	0.58 (0.49–0.67)	—	0.62 (0.54–0.72)	0.56 (0.49–0.65)	—
Dutch- vs. English-Africans						
Dutch-African	1.00	1.00	1.00	1.00	1.00	1.00
English-African	0.68 (0.46–1.01)	0.76 (0.51–1.17)	0.53 (0.29–0.99)	0.18 (0.08–0.41)	0.18 (0.08–0.42)	0.37 (0.14–0.99)
English-Caribbean	0.67 (0.52–0.86)	0.72 (0.56–0.93)	0.48 (0.31–0.75)	0.86 (0.65–1.121)	0.87 (0.67–1.12)	0.39 (0.21–0.69)
Dutch vs. English South Asians						
Dutch South Asian	1.00	1.00	1.00	1.00	1.00	1.00
English-Indian	0.41 (0.32–0.53)	0.49 (0.38–0.62)	0.67 (0.51–0.89)	0.17 (0.09–0.32)	0.16 (0.08–0.31)	0.16 (0.07–0.37)
English-Pakistani	0.61 (0.48–0.77)	0.65 (0.52–0.82)	0.62 (0.46–0.82)	0.23 (0.13–0.40)	0.19 (0.10–0.36)	0.13 (0.05–0.33)
English-Bangladeshi	0.86 (0.68–1.08)	0.85 (0.67–1.07)	0.77 (0.59–0.99)	0.26 (0.12–0.54)	0.18 (0.07–0.44)	0.11 (0.03–0.45)

Note. Model 1 (adjusted for age and year of survey), Model 2 (plus socioeconomic status), and Model 3 (plus religion and length of stay in residing country; only in minority groups because there were no data on White-English group). PR = prevalence ratio.

Table 3. Adjusted PRs (95% CI) of ever smoking and cessation within White-European, South Asian, and African origin populations by sex

	Ever smoking			Smoking cessation		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
	PR (95% CI)	PR (95% CI)	PR (95% CI)	PR (95% CI)	PR (95% CI)	PR (95% CI)
Men						
Dutch- vs. English-Whites						
White-Dutch	1.00	1.00	—	1.00	1.00	—
White-English	0.85 (0.79–0.92)	0.83 (0.77–0.90)	—	1.34 (1.14–1.58)	1.41 (1.20–1.66)	—
Dutch- vs. English-Africans						
Dutch-African	1.00	1.00	1.00	1.00	1.00	1.00
English-African	0.92 (0.71–1.18)	0.98 (0.76–1.27)	0.85 (0.54–1.22)	1.86 (1.08–3.20)	1.71 (0.99–2.96)	2.39 (1.27–4.51)
English-Caribbean	0.81 (0.67–0.97)	0.84 (0.70–0.99)	0.72 (0.54–0.96)	1.57 (1.02–2.48)	1.51 (0.98–2.34)	2.16 (1.27–3.70)
Dutch vs. English South Asians						
Dutch South Asian	1.00	1.00	1.00	1.00	1.00	1.00
English-Indian	0.51 (0.43–0.60)	0.55 (0.46–0.66)	0.66 (0.54–0.81)	1.55 (1.05–2.31)	1.30 (0.85–1.95)	1.01 (0.63–1.62)
English-Pakistani	0.67 (0.57–0.80)	0.69 (0.59–0.82)	0.66 (0.53–0.83)	1.28 (0.85–1.95)	1.22 (0.80–1.85)	1.57 (0.82–3.00)
English-Bangladeshi	1.03 (0.89–1.19)	1.03 (0.88–1.20)	0.98 (0.80–1.20)	1.48 (0.98–2.27)	1.52 (1.01–2.29)	2.16 (1.14–4.11)
Women						
Dutch- vs. English-Whites						
White-Dutch	1.00	1.00	—	1.00	1.00	—
White-English	0.76 (0.70–0.82)	0.72 (0.67–0.78)	—	1.27 (1.07–1.50)	1.34 (1.13–1.60)	—
Dutch- vs. English-Africans						
Dutch-African	1.00	1.00	1.00	1.00	1.00	1.00
English-African	0.25 (0.14–0.45)	0.26 (0.14–0.46)	0.29 (0.13–0.62)	1.46 (0.86–2.50)	1.37 (0.76–2.49)	0.97 (0.38–2.48)
English-Caribbean	1.06 (0.90–1.24)	1.07 (0.90–1.26)	0.64 (0.48–0.85)	1.37 (1.04–1.81)	1.39 (1.04–1.87)	1.84 (1.20–2.81)
Dutch vs. English South Asians						
Dutch South Asian	1.00	1.00	1.00	1.00	1.00	1.00
English-Indian	0.19 (0.12–0.30)	0.17 (0.11–0.28)	0.14 (0.07–0.27)	1.34 (0.72–2.52)	1.18 (0.61–2.29)	0.88 (0.35–2.22)
English-Pakistani	0.21 (0.13–0.34)	0.20 (0.11–0.34)	0.12 (0.06–0.24)	0.87 (0.40–1.88)	1.02 (0.44–2.38)	0.65 (0.25–1.65)
English-Bangladeshi	0.22 (0.11–0.42)	0.18 (0.08–0.40)	0.11 (0.04–0.34)	0.64 (0.17–2.41)	0.77 (0.21–2.74)	0.52 (0.12–2.32)

Model 1 (adjusted for age and year of survey), Model 2 (plus socioeconomic status), and Model 3 (plus religion and length of stay in residing country only in minority groups). PR = prevalence ratio.

quit smoking and were in the precontemplation phase (73%). This, in turn, might have contributed to the relatively high rates of ever smoking found among the Dutch ethnic minority groups.

The findings are worrisome because both African and South Asian populations in Europe experience higher mortality in a number of disease categories compared with White populations. For example, African origin populations experience substantial excess of stroke morbidity and mortality and South Asians experience substantial excess of both coronary heart diseases and stroke morbidity and mortality (Agyemang et al., 2009; Bos, Kunst, Keij-Deerenberg, Garssen, & Mackenbach, 2004; Gill et al., 2007), all of which are directly affected by tobacco use (U.S. Department of Health and Human Services, 2004; West, 2006; World Health Organization, 2008). The relatively high prevalence of smoking among the Dutch-Africans and South Asian men may further exacerbate their already increased risks of cardiovascular morbidity and mortality if immediate actions are not taken to curb the high prevalence of smoking among these populations in the Netherlands. The low prevalence of smoking cessation among Dutch-Africans and South Asian men highlights the need to give greater

attention to ethnic minority groups in national tobacco control policies. The fact that majority of the Surinamese smokers are not motivated to quit smoking suggests that more effective cultural sensitive health education programs are needed for this population (Bhopal & White, 1993; Nierkens et al., 2006).

To conclude, similar to the White group, the prevalence of smoking was lower in English South Asian and African ethnic groups than in their corresponding Dutch counterparts. Ever-smoking rates were lower and smoking cessation rates were higher in English-African groups and South Asian men than in their corresponding Dutch counterparts. These differences suggest that, among other factors, antismoking policies might have a similar influence on both ethnic majority and minority groups and illustrate the potential importance of national policy context for ethnic minority groups' smoking behavior. More efforts are needed to scale up tobacco control policies for both ethnic majority and minority groups in the Netherlands. Targeted and culturally sensitive approaches may be required for the ethnic minority groups, particularly among Dutch-Africans and Dutch South Asian men in whom smoking cessation rates are relatively low.

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Declaration of Interests

None declared.

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